b) Verizon VA's Copper Repair Expense Reduction Is Appropriate.

As noted above, Verizon reduced its repair expenses for copper cable by 5% to reflect the lower and less frequent repair costs Verizon VA estimated would be associated with newer copper cable, in contrast to the cable in Verizon VA's network, which can be over 30 years old. (VZ-VA Ex. 122 at 34-35.) As Mr. Minion explained at the hearing and in his written testimony, this estimate is "based upon [Verizon's] understanding and knowledge of the detailed operations and engineering of the network" and aggressive assumptions regarding the latest design standard and materials for copper cable. (Tr. at 3808, 3886; VZ-VA Ex. 122 at 35 n.29.)

AT&T/WorldCom argue, not surprisingly, that this 5% reduction should be substantially increased to 30%. But they provide no evidence in support of this contention. The primary basis for Petitioners' argument is a set of Verizon Maryland outside plant rehabilitation/relief estimate authorization documents. (AT&T/WCom Ex. 12 at 91, WCom Ex. 109-111.) As Mr. Minion demonstrated conclusively, however, AT&T/WorldCom's reliance on these documents is utterly misplaced. Petitioners have suggested that these documents show that Verizon MD estimated that rehabilitation of older copper cable plant will result in reductions of cable repair expenses by 90%. (*See, e.g.*, Tr. at 3817-18.) But as Mr. Minion explained, the documents in question are used for planning and evaluation purposes rather than to forecast actual repair expenses, and the 90% repair reduction estimate is merely an arbitrary, standardized value used to facilitate comparison of rehabilitation expenses in different distribution areas:

> The purpose of this form is to have a common set of circumstances around which to be able to prioritize within budgeting constraints the actual potential savings for comparative purposes. *It doesn't indicate that there's truly a 90% reduction expected. ...*

(Tr. at 3817-18.) In fact, Mr. Minion demonstrated that the documents on their face demonstrated that actual repair expectations for the specific distribution area at issue bore no relationship to the 90% fixed assumption:

> . . . [I]f you look at the very front page of the estimate authorization [WCom Ex. 110], rather than trying to figure out a budgeting tool, an actual expectation on the front page indicates that *for this tracking unit*, the specifics here are only a 75% number of reductions. That is where you would find actual reductions. *The 90% is just an arbitrary number used for budgeting purposes within constraints for ranking the order of which you're going to do tracking unit rehabilitation.*[69/]

(Tr. at 3818 (emphasis added).)

Nor does Petitioners' assertion that new copper in the forward-looking network would have exponentially lower repair expenses make sense. It is pure fantasy to assert that even a brand new facility will forever be trouble-free and will never need repair once laid in the ground. This might be true on day one, but over time — for example, over the three years during which the TELRIC costs in the imaginary new network will be in effect — new copper would, like any physical asset, age. Repair costs cannot be expected just to disappear or drop precipitously over the long run. They are a fact of operating a network.[70/] (Tr. at 3894.)

69/ In any event, as Mr. Minion explained, significant expense savings through rehabilitation of plant, like the 75% in the above example, are likely to occur only in those distribution areas experiencing high degrees of trouble. The Maryland outside plant estimate authorizations relied upon by AT&T/WorldCom concerned areas with an outside plant related trouble report rate three times higher than the average trouble report rate in Virginia. (*See, e.g.*, Tr. at 3824.) Thus, even if the rehabilitation documents were in any way relevant to demonstrating any actual expected repair expense reductions, the percentage reduction for distribution areas with high trouble rates would bear no relationship to the percentage reduction one might expect in the Virginia network as a whole.

70/ Mr. Minion also explained the fallacy of Petitioners' suggestion that "M" expenses should be reduced by 30% as well as repair expenses. "M" dollars are expenses relating to moves, changes, and rearrangements of plant, as even Mr. Riolo conceded. (Tr. at 3897; *see also* VZ-VA Ex. 122 at 37-38.) Such activities do not become less expensive as a result of the

c) Verizon VA Does Not Seek to Recover Any Specific Y2K Expenditures.

Verizon VA used its 1999 information systems (IS) costs as a reasonable proxy for the amount of IS expenses it expects to incur in the future. AT&T/WorldCom argue that this is inappropriate, because some of the IS costs in 1999 were related to one-time Y2K expenditures that allegedly inflated the 1999 IS budget and thus the related ACF. This is false. Verizon VA did not augment its usual IS budget with Y2K expenses in 1999. Rather, Verizon simply allocated a portion of its defined IS budget for 1999 to Y2K projects. Y2K activities replaced or delayed other projects planned for 1999; in other words, in the absence of Y2K projects, the total IS budget would have remained the same, but some other project would have consumed the Y2K dollars. (VZ-VA Ex. 122 at 39-40; *see also* Tr. at 3912-13.) That is the challenge of choosing the base year for ACF calculations — no year is entirely typical of any other in terms of the particular projects performed, so the fact that the 1999 IS budget included Y2K expenses as opposed to expenses for some other project does not render it unrepresentative for ACF purposes. As Mr. Minion testified, the 2000 IS budget, which did not include Y2K expenses, was actually 10% *higher* than the 1999 IS budget. (Tr. at 3826.)

d) Inclusion of Wholesale Marketing Expenses Is Appropriate.

AT&T/WorldCom attack Verizon VA's Wholesale Marketing ACF as an attempt by Verizon VA to recover for retail advertising unrelated to the provision of UNEs. This is simply not the case. The Wholesale Marketing ACF properly captures the advertising, product

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replacement of old copper plant with newer plant, as FCC staff questions appeared to recognize. (*See* Tr. at 3886-87.) AT&T/WorldCom were not able to demonstrate any basis for reducing "M" expenses by *any* amount as a result of new copper in the network, much less a 30% reduction.

management, and customer interfacing expenses that Verizon VA will incur in the forward-looking wholesale marketplace that, according to the Commission, must be assumed to be a "competitive market for [UNE] offerings."[71/] Indeed, competing providers of wholesale services and facilities already provide alternatives to the use of Verizon VA's network. As a result of such competition, Verizon will be forced to engage in advertising designed to capture UNE customers, especially if the company's retail business were to erode in response to the entry of competitors. Thus, dollars are likely to shift from pure retail advertising to either combined retail-wholesale advertising, such as market stimulation advertising,[72/] or advertising aimed at promoting wholesale sales in particular, such as direct-to-CLEC advertising. (*See* VZ-VA Ex. 122 at 42-48.) All of this advertising is typical of advertising in which wholesale providers engage, and AT&T/WorldCom have shown no basis to question it. Their sole argument is to insist that Verizon VA does not engage in any marketing associated with UNEs at this time and has not demonstrated that it spends a specific amount on wholesale marketing today (or more specifically, in 1999.) (*See, e.g.*, Tr. at 3697-98.) But this misses the point entirely: TELRIC costs must be based upon the fully competitive market of the *future*, and in that market, Verizon clearly *would* engage in wholesale advertising as a means of protecting and growing its revenue.

71/ *See, e.g., Local Competition Order* at 15846-47 ¶ 679 ("Adopting a pricing methodology based on forward-looking, economic costs best replicates, to the extent possible, the conditions of a competitive market"); *id.* at 15871 ¶ 738 ("In these proceedings, we are establishing pricing rules that should produce rates for monopoly elements and services that approximate what the incumbent LECs would be able to charge if there were a competitive market for such offerings.").

72/ For example, a campaign designed to promote DSL usage would stimulate orders for DSL from Verizon's customers, but also would stimulate CLEC customers to order DSL, which in turn would cause those CLEC customers to purchase DSL from Verizon VA.

Because there is no other basis for estimating the wholesale marketing budget of the future, Verizon VA has used its 1999 advertising budget as a reasonable proxy. Given that the relative importance of the wholesale market should grow over time, it is reasonable to assume that today's advertising budget will be reallocated to serve that market. Conversely, the advertising budget will not drop when Verizon VA faces new retail and wholesale competition. Indeed, when MCI and Sprint began competing with AT&T years ago, AT&T's advertising budget did not drop; to the contrary, AT&T witness Mr. Kirchberger suggested that AT&T's advertising expenses skyrocketed. (Tr. at 3722, 3708.) Thus, using an expense relationship based on Verizon's 1999 retail advertising budget is a fair estimate of its forward-looking wholesale advertising budget.

e) Verizon VA's Treatment of Non-Recurring Cost Revenues and OSS Costs in the Development of ACFs Was Appropriate.

AT&T/WorldCom also attack the validity of Verizon VA's ACF calculations on the ground that Verizon VA removed the ongoing costs of OSS and an amount equal to the revenues associated with non-recurring activities out of the expenses it used to calculate its ACFs. As we explain below in discussing Verizon VA's non-recurring cost study, Verizon VA removed non-recurring revenues from its ACFs to avoid double recovery of non-recurring costs in its recurring rates. The adjustment AT&T/WorldCom recommend — eliminating entirely this subtraction of non-recurring revenues (*see* AT&T/WCom Ex. 12 at 93-94) — is simply a function of their misguided position that almost all non-recurring costs should be recovered on a recurring basis. Their position on OSS costs is equally perplexing. Verizon VA backs ongoing OSS costs out of the ACF expenses because Access to OSS is a separate UNE; if the related OSS costs are properly driven to that UNE, then users of that UNE will appropriately pay its costs. (*See* VZ-VA Ex. 122 at 245.) Petitioners argue that such costs either should not be recovered at all or

should be recovered through an end-user charge or at best as an ACF. But, as discussed in Part IV below, the costs of Access to OSS should rightfully be recovered from CLECs like all other UNE costs.

IV. VERIZON VA'S RECURRING COST STUDIES

A. Loops

The costs produced by Verizon VA's studies are based on providing loops in a forward-looking, TELRIC-compliant network that is designed to serve all demand within the Commonwealth.[73/] Verizon VA's studies use a network design that preserves certain physical characteristics of Verizon VA's existing network, because those characteristics represent the most sensible measurement of the physical characteristics of a forward-looking network capable of serving Virginia demand. At the same time, in compliance with TELRIC principles, Verizon VA assumed the wholesale replacement of technology in its entire existing network with a forward-looking technology mix. In all cases, Verizon VA's decisions concerning its network and model inputs were informed by Verizon VA's experience operating a network capable of serving Virginia customers. Thus, unlike the MSM, Verizon VA's loop cost model produces the forward-looking costs of providing unbundled loops in a functional network that can actually serve the Virginia customer base.

AT&T/WorldCom's criticisms, which portray Verizon VA's approach as an effort to recover embedded costs and as fundamentally biased, ring hollow. In several cases, the network assumptions used in Verizon VA's loop cost studies are significantly more forward-looking than those used in the MSM, and in all cases, they are more realistic in valuing a potentially

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73/ Verizon VA's loop studies are addressed in VZ-VA Ex. 107 at 34-40, 78-178; and VZ-VA Ex. 122 at 59-147.

functional network. In formulating the key assumptions for assessing loop costs, including line counts, structure sharing, plant mix, utilization, and loop investment, Petitioners use hypothetical data designed solely to lower costs, without regard to whether they have any grounding in actual reality or even theoretical possibility. Verizon VA has provided the Commission the only reliable, testable approach and inputs for modeling those costs.

1. Description of Verizon VA's Loop Cost Model

To develop the forward-looking costs for all the UNE loops that it offers,[74/] Verizon VA used a "capacity costing" approach. This approach is, as Verizon VA witness Joseph Gansert explained, "methodologically extraordinarily different" from, and far more reliable than, the MSM. (Tr. at 4347.) The MSM undertakes the extraordinarily complex and inherently unreliable task of simulating the assembly and tallying the costs of every piece of an imaginary network and divides this total cost by a projection of total loop demand to produce UNE rates. This abstract modeling process is inherently hypothetical. As Mr. Gansert noted, "[i]n my 30-year career, I have never seen a model that could effectively simulate the network and produce dollars that accurately represented what actually came out." (Tr. at 4348.)

Verizon VA's capacity cost model is designed to determine an average, representative cost of providing one loop — *i.e.*, one unit of network capacity. It was not necessary for Verizon VA to calculate the total cost of the network to determine the costs of this representative, model loop. Rather, as Verizon VA witness Gary Sanford explained, Verizon VA's cost model

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[74/] Verizon VA offers two- and four-wire analog loops, off-premise extension unbundled loops, ISDN/BRI (two-wire digital loops), digital four-wire (56 and 64 Kbps) loops, two- and four-wire customer-specified signaling loops, DS1/ISDN PRI loops, DS3 high capacity loops, xDSL-compatible loops, subloops, and dark fiber loops.

"identif[ied] each component that is utilized by a loop, . . . and for each component we identified the investment and divide[d] it by the capacity [of that component] to arrive at an investment per unit of capacity." (Tr. at 4104.) Verizon VA then took a weighted average of the investments for the "typical" loop in each Ultimate Allocation Area (UAA) (and then for the UAAs in each wire center) to produce the average loop investment for each wire center in Virginia.

More specifically, this cost analysis is comprised of the following key steps: first, Verizon VA identified the relevant physical characteristics of the "typical" loop in each UAA. To do this, Verizon VA used data regarding the average feeder length, maximum distribution length, and the predominant structure type used in each UAA, which was collected as part of a comprehensive, multi-year network survey performed by Verizon's outside plant engineers throughout Virginia. Other data used to determine the relevant characteristics of the typical loop in each UAA included up-to-date data concerning the number of distribution areas and working lines in each UAA and wire center. (VZ-VA Ex. 107, Attachment B at 28-31.)

To determine the average investment for the "representative" loop in each UAA, Verizon VA fed this data into its loop cost analysis model (LCAM). For each component of the loop, LCAM applied per-unit investments based on actual Verizon VA data, with appropriate forward-looking adjustments. Verizon VA also made the important assumption that the forward-looking network would take advantage of the efficiencies of deploying fiber-based digital loop carrier systems on longer or more concentrated feeder routes. The specific parameters of this assumption for longer routes were based upon a sensitivity analysis performed by Verizon VA in order to determine the feeder length at or beyond which it is more cost-effective to deploy fiber facilities. (*See* VZ-VA Ex. 107 at 95-97.) Verizon VA's loop cost studies assumed that Verizon VA's fiber deployment conformed to these efficient assumptions throughout the entire network,

and thus produced the costs of loops that reflect a far higher degree of fiber than exists in Verizon VA's actual network today or is expected to exist anytime in the foreseeable future. (*See* VZ-VA Ex. 107 at 94.)

Using this data, Verizon VA calculated the average cable investment per loop for each UAA and then determined the weighted average cable and structure investment per loop across all UAAs within each wire center. For fiber-fed loops, Verizon VA's model also calculated and added on the appropriate, forward-looking electronics investment for each type of loop. This was calculated by identifying the appropriate remote terminal size needed to serve the working lines in each UAA and distribution area. The electronics investments also reflect assumptions concerning the forward-looking mix of IDLC and UDLC in the network.[75/]

This approach allowed Verizon VA to use reliable, valid data as the basis for every input and assumption in its loop cost model. The inputs are forward-looking and reflect the needs of a robust functional Virginia network. There is no basis in the record for the Commission to rule otherwise.

[75/] The model also applies the various ACFs, discussed above, and the utilization factors, discussed below, to the average cable, supporting structure, and electronics investments per wire center, in order to produce annualized loop costs for each wire center. Those annualized costs were weighted by the relative proportions of copper and fiber in the wire center and the number of working lines at each wire center to produce jurisdiction-wide or density zone-wide composite loop costs.

2. The Network Assumptions Underlying Verizon VA's Loop Studies Are Forward-Looking and TELRIC-Compliant.

a) The Data from Verizon's Engineering Survey Are a Valid Part of the Choice Set for the Forward-Looking Network.

As previously noted, Verizon VA's loop cost model relies on, among other items, data culled from a detailed engineering survey of Verizon VA's network that was performed, at great expense and effort, between 1993 and 1995.[76/] Because the survey looked at Verizon VA's network as it existed at that time, AT&T/WorldCom insist that Verizon VA's reliance on the data is impermissible and that the resulting cost studies "are not forward-looking at all."[77/] (AT&T/WCom Ex. 12 at 12.) This is simply a nonsequitur. The Commission has recognized that a TELRIC cost study can consider "fundamental" elements of "existing network design."[78/] And as explained above, economic principles clearly allow an incumbent to choose to "redesign" the forward-looking network to include features of the existing network, if those features are efficient and forward-looking — in other words, elements of the existing network are a valid part of the "choice set" that the incumbent may decide are most efficient to use. (Tr. at 2907

[76/] While the engineering survey collected several types of information, Verizon VA used it only for determining the typical loop lengths, copper feeder cable sizes, and structure types (*i.e.*, aerial, buried,or underground) in each UAA. (VZ-VA Ex. 122 at 62.)

[77/] Petitioners also attempt to devalue the survey by suggesting that Verizon's engineers were confused when they filled it out or provided only interim data that should not be used. (AT&T/WCom Ex. 12 at 14.) There is nothing to these points, as Verizon VA has explained. The relevant questions asked by Verizon VA's engineers demonstrated that they understood the point of the survey overall and that, where clarification was needed, it was sought and provided. The survey responses thus were extremely reliable, and none of the data used in Verizon VA's loop cost studies could be characterized in any way as interim. (VZ-VA Ex. 122 at 67-71.)

[78/] FCC Reply Brief at 4-5; *see also Local Competition Order* at 15848-49 ¶ 685 (TELRIC prices should be based on efficient technology that is compatible with "existing infrastructure" and should take "existing network design" into account.).

(Shelanski).) As Dr. Shelanski observed "[t]he goal of the long run economic analysis is to see what is efficient over time, not to see how much you can change over time." (Tr. at 2900.)

The loop routes and structure that Verizon VA has placed in the real, functional network in Virginia *are* efficient and provide the best estimate of what *any* wireline carrier today, or at any point in the future, would build to serve demand in the Virginia network given the static location of the network's wire centers and customers, the geography of the state, and the myriad municipal requirements and zoning laws that dictate placement and type of cable structure and support. It is true that, as Commission staff noted, no formal model "optimization run" was performed to ensure that the existing routes or structure mix produced the cost-minimizing effect. However, as Dr. Tardiff explained, the "cost minimizing mix [in Verizon's studies] is based more on experience than actual runs in the model." [79/] (Tr. at 3101.)

Mr. Gansert testified that in building the routes in Verizon's networks, the company's engineers "follow[ed] economic practice," and that the existing routes, cable sizes, and structure represent Verizon VA's experience concerning the most efficient means of reaching its customers, responding to the development of customer demand, and addressing the challenges of the state's particular geography and density. (Tr. at 4351.) As Mr. Gansert noted, the feeder and distribution routes thus are, "if not perfect, the best estimate that one could ever make of the routes needed in Virginia." (Tr. at 4349.) There might be isolated routes that would produce a lower cost in a model run, but, "it borders on a little preposterous to suggest that a theoretical hypothetical abstract algorithm could create better routes" than those that Verizon VA has laid over time to meet real network needs. (Tr. at 4349.) This is particularly likely to be the case

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[79/] As Dr. Shelanski observed, "there's nothing that says a forward-looking cost study needs to be based on a computer algorithm." (Tr. at 3140.)

when the hypothetical algorithm sponsored by AT&T/WorldCom in the MSM does not even attempt to take into account the location of actual rights of way, geographical features, municipal ordinances, and other critical variables that constrain and, in many cases, dictate placement of cables in a real network. (Tr. at 4349.)

Moreover, no evidence demonstrates that any substitute route design or structure mix would be more efficient than anything in the existing network. Petitioners vaguely suggest that there could be inefficiencies hidden in this network and that, for example, changes in road locations and similar developments might provide opportunities to use a shorter route than the one reflected in the Verizon engineering survey. (AT&T/WCom Ex. 12 at 15.) But Petitioners provide not *one* example of such a route, nor any explanation of why similar developments might not require longer, more expensive routes. In the same vein, Petitioners fail to identify any location in the network where an alternative structure type should be substituted. This is not surprising, given that Verizon VA's network uses large amounts of aerial cable in its network, which is the least expensive structure type. AT&T/WorldCom's hypothetical new entrant would never be able to replicate the use of aerial cable in Verizon VA's network, especially given the trend toward municipal requirements to use buried cable, which is a more expensive structure type.[80/] (VZ-VA Ex. 122 at 65.)

In truth, of course, even if one or two such examples *could* be identified, there would be no reason to scrap the network as a whole: the cost savings that could be achieved across the

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[80/] Petitioners criticize Verizon's engineering survey for using buried cable as the default structure type where engineers failed to specify the predominant structure in a given UAA. But in the "overwhelming majority" of cases the engineers did specify the cable type, and buried cable therefore was rarely assumed. (VZ-VA Ex. 122 at 70.)

entire network merely by shortening one or two routes is less than negligible.[81/] Moreover, actually changing routes to take advantage of a new road that would, for example, allow a shorter route to be built, likely would involve costs so unreasonable as to overwhelm any superficial cost savings. New routes built today — taking advantage of the new roads Petitioners hypothesize — would, for logical consistency, have to reflect the many factors (such as municipal requirements that new cable routes be underground or buried and restrictions on the placement of new cable in historical and environmental preservation areas) that make the establishment of new routes much *more costly* and much *less efficient*. Moreover, if Petitioners really contend that every route in the network actually would be physically built anew over new paths, the construction costs, excavation costs, and material costs would be *enormous*. (*See* VZ-VA Ex. 122 at 64-65.) As Dr. Shelanksi observed, it is "manifestly obvious that the costs of changing the route structure would be enormous [and] that it [is] not something that would be even remotely efficient to do, no matter how long a horizon you look over." (Tr. at 2946.)

Finally, Petitioners have not even pretended to suggest a specific adjustment to Verizon VA's forward-looking costs in conjunction with their criticism of Verizon VA's existing loop lengths; they simply assert that the Commission should reject Verizon VA's loop cost model altogether. This assertion is particularly absurd because the cable routes produced by AT&T/WorldCom's own MSM are not very different in length from those in Verizon VA's network once the MSM's line counts have been adjusted to reasonable levels. As Mr. Gansert observed, "[t]here has been a lot of blather in these proceedings about how inefficient our network is, but I would suggest you look at the lengths of the feeder and distribution and the

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[81/] Moreover, changing a handful of routes or structure types throughout the network would have minimal, if any, impact on the *average* loop data per UAA used in LCAM. (VZ-VA Ex. 107 at 173.)

loops that the MSM produces. It isn't any different than ours [if proper line counts are used]." (Tr. at 4350.) Indeed, once line counts are adjusted to reasonable levels, the MSM produces *longer* routes than Verizon VA's. (Tr. at 4350.)

b) Verizon VA's Assumptions Regarding Outside Plant Technology Mix Are Forward-Looking and Produce TELRIC-Compliant Costs.

Verizon VA's assumptions regarding the technology mix in its model are aggressively forward-looking. Thus, the forward-looking network used for Verizon VA's cost studies differs markedly from the existing Virginia network and indeed from any real network that is likely ever to exist in Virginia.

(1) Verizon VA Assumed Far More Fiber for Cost Study Purposes Than Exists in the Embedded Network.

In order to comply with TELRIC requirements, Verizon VA assumed widespread deployment of fiber-fed loops in place of the existing copper feeder throughout its network. Thus, while 33% of the loops in Verizon VA's existing network are fiber-fed, Verizon VA assumed that more than 82% of all lines in the forward-looking network would be fiber-fed. (VZ-VA Ex. 122 at 76, 84.) Of course, while Verizon VA is methodically replacing copper with fiber where it makes sense, in truth Verizon VA will not actually achieve anywhere near 82% fiber-fed loops anytime in the foreseeable future. (VZ-VA Ex. 122 at 76.) Rather, the percentages assumed for study purposes are designed solely to reflect the most forward-looking, cost-optimizing technology mix that would exist if Verizon VA's entire network had been rebuilt to reflect the efficiencies of deploying fiber-fed digital loop technology. (Tr. at 2947-48.) Notably, Petitioners did not criticize or question Verizon VA's copper-fiber assumptions. This may stem from the fact that Verizon VA assumed a *much* greater percentage of fiber-fed loops in the network than Petitioners assumed in the MSM: the MSM assumes 60% copper feeder —

more than triple the amount of copper assumed in the Verizon VA model, and only slightly less than exists in Verizon VA's network today.[82/] (Tr. at 4078.)

As previously noted, the deployment of fiber on longer routes in Verizon VA's cost studies is based on optimization runs performed within Verizon's model to determine the feeder length beyond which deployment of fiber feeder facilities would be more efficient than copper.[83/] By substituting several different values for the so-called copper-fiber breakpoint, and measuring the resulting average statewide loop rate, Verizon VA determined that fiber feeder facilities would be assumed for all feeder routes 4,000 feet and longer.[84/]

There also are circumstances in which it is economical to install fiber feeder facilities on feeder routes shorter than 4,000 feet. For single locations with a large number of customers (such as a large apartment or office building), it may be possible to locate a remote terminal inside a building, in which case fiber feeder facilities are the cost-optimizing approach, even if the feeder length is shorter than the breakpoint. (Tr. at 4462-63.) Verizon VA therefore made the forward-looking, efficient assumption that all customer locations with at least 150 lines (even if within 4000 feet of the central office) would be served by fiber feeder connected to a remote

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82/ The fact that the MSM makes this high cost assumption and still produces lower costs than Verizon VA's loop cost model should raise a red flag; something other than allegedly efficient network design in the MSM must account for this illogical result.

83/ Fiber facilities are more efficient in many instances because they do not require the same types of costly network components (*e.g.*, heavier gauge cables, load coils, and repeaters) that copper cables require on longer routes. (*See, e.g.*, VZ-VA Ex. 107 at 95.)

84/ In fact, the analysis showed that setting the breakpoint in the range of 3,000 to 5,000 feet of feeder length produced the lowest statewide average loop rates (with immaterial differences in that range). Verizon VA accordingly chose the middle of that range. (*See* VZ-VA Ex. 107 at 95-96.)

terminal located on the customer premises.[85/] (Tr. at 4462-63; *see also* VZ-VA Ex. 107 at 95-96.)

(2) Verizon VA Assumed the Forward-Looking Mix of Integrated Digital Loop Carrier and Universal Digital Loop Carrier Necessary to Provide UNEs and Other Services.

Verizon VA also assumed a forward-looking mix of fiber-fed digital loop carrier (DLC) technologies for the cost studies. In the forward-looking network envisioned for cost study purposes, Verizon VA assumed that 70% of the fiber-fed loops (or 57.6% of all loops) would use integrated DLC (IDLC), and 30% of the fiber-fed loops (or 24.7% of all loops) would use universal DLC (UDLC). (VZ-VA Ex. 107 at 97.) This forward-looking assumption was informed by Verizon VA's experience regarding the mix that it has used in recent DLC deployments. (VZ-VA Ex. 107 at 97.) The deployment assumed by Verizon VA far exceeds anything that will occur in Verizon VA's real network; for TELRIC purposes, Verizon VA assumed that its mix for new DLC deployments was implemented network-wide.

Nonetheless, AT&T/WorldCom argue that Verizon VA's network construct is not sufficiently forward-looking. In Petitioners' opinion, the forward-looking network should reflect *none* of what AT&T/WorldCom characterize as the "less efficient analog Universal DLC," and thus all fiber-fed loop costs should reflect the generally lower costs of using only IDLC

85/ The threshold of 150 working lines was designed to produce deployment of fiber only to customer locations where a 224-line remote terminal could be deployed with a cost-effective level of utilization. (Tr. at 4462.) The Commission inquired whether it might be more efficient to use copper feeder to serve distribution areas located between 4,000 and 12,000 feet of the central office but with fewer than 200 lines. As Mr. Gansert explained, such areas are rare and would have a marginal impact on average loop costs. (Tr. at 4466-67.) Moreover, it would be extremely burdensome to analyze the factors that would have to be considered to assess whether copper feeder might be appropriate for such individual distribution areas.

technology. (AT&T/WCom Ex. 12 at 20.) The problem, however, is that Petitioners wrongly assume that UDLC and IDLC are perfect substitutes for one another — that IDLC is simply a better and more advanced version of UDLC, so that the inclusion of UDLC in the network is necessarily an effort to recover the costs of "Verizon's outdated embedded infrastructure." (AT&T/WCom Ex. 12 at 20.) This contention simply ignores the inherent limitations of IDLC technology and reflects either the lack of experience that AT&T/WorldCom's witnesses have in running a local exchange network, or Petitioners' willingness to assume any position that produces lower model costs, even if the position would produce a network incapable of providing the relevant services.

It is uncontroverted that a functioning local exchange network must include UDLC technology. Regardless of whether stand-alone loops can be unbundled using an IDLC interface (which they cannot), UDLC is necessary to provide services *other* than unbundled loops. For example, as Mr. Gansert explained, UDLC is needed to provision the non-switched services that comprise more than 10% of Verizon's services. (VZ-VA Ex. 107 at 97-98; Tr. at 4160.) Moreover, UDLC is specifically necessary to provision non-switched services that connect a copper-fed loop to a fiber-fed loop. As Mr. Gansert explained, making that connection without UDLC is "a physical impossibility."[86/] (Tr. at 4079.) In addition, in some cases UDLC is more cost-effective than IDLC, depending on the size of the remote terminal. (Tr. at 4148, 4556.)

Petitioners simply ignore these very real needs for UDLC in all functioning, forward-looking networks. Instead, they undertake an extensive discussion claiming that IDLC can be

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86/ This need for UDLC makes the network that AT&T/WorldCom model in the MSM all the more puzzling. AT&T/WorldCom have proposed a model in which 60% of the loops are copper-fed but cannot be connected (other than through the switch) to any of the remaining 40% fiber-fed loops because of the complete lack of any UDLC. (*See* Tr. at 4079.)

used to provision unbundled stand-alone loops through a GR-303 interface[87] and that all unbundled loops therefore should reflect the lower costs associated with IDLC. AT&T/WorldCom are simply wrong. As Mr. Gansert explained, "the GR303 switching technology that we have today and the matching digital [loop] carrier technology we have today lacks some *fundamental functional capabilities* that would be needed" to provision unbundled stand-alone loops using GR-303. (Tr. at 4082 (emphasis added).) To insist nonetheless that a TELRIC study must price loops on the basis of such technology is plainly a departure from the requirements of the Commission's express rule that TELRIC cost studies must be based on "the most efficient telecommunications technology *currently available.*"[88]

As the record reflects, the industry has been struggling for years to resolve the fundamental security, error-protection, OSS, and operational challenges that are preventing the idea of using a GR-303 interface to unbundle loops in a multi-carrier environment from becoming a reality. (*See, e.g.*, VZ-VA Ex. 122 at 77-80; Tr. at 4081-85, 4164-65.) As Petitioner WorldCom's own 1998 presentation on the potential for GR-303 unbundling recognizes, these problems include ensuring cross-compatibility of equipment from multiple vendors, the need to develop testing capabilities, and the absence of necessary OSS functionality. (Tr. at 4578-81; VZ-VA Ex. 155, Slides 9-10.) In fact, as demonstrated by document after document introduced by Petitioners at the hearing, discussions of GR-303 unbundling invariably include an acknowledgement of the very real implementation problems that have not been resolved.[89]

87/ There are two types of IDLC interfaces: TR-008 and GR-303. AT&T/WorldCom do not claim that it is possible to unbundle individual loops using the TR-008 interface.

88/ 47 C.F.R. § 51.505(a)(1) (emphasis added).

89/ For example, during cross examination, counsel for WorldCom showed Mr. Gansert a copy of an SBC presentation that discussed GR-303 unbundling. As Mr. Gansert pointed out,